

# ON A SUBSTRATE FORMED OR RESTING DISPLAY ARRANGEMENT

## PRIORITY REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 10/494,055, entitled ON A SUBSTRATE FORMED OR RESTING DISPLAY ARRANGEMENT, filed on Apr. 29, 2004 by inventor Magnus George Goertz, which claims benefit of PCT Application No. PCT/SE02/02000, entitled ON A SUBSTRATE FORMED OR RESTING DISPLAY ARRANGEMENT, filed on Nov. 4, 2002 by inventor Magnus George Goertz.

## FIELD OF INVENTION

The present invention relates generally to a display arrangement, that is formed onto or is supported by a substrate, and more particularly to a mobile-telephone-adapted touch screen arrangement, which is constructed with and around a display unit, whose external dimensions conform with those applicable to mobile telephone apparatus or cell phones.

The touch screen arrangement is hereinafter abbreviated to "touch screen".

## DESCRIPTION OF THE BACKGROUND ART

Mobile telephone displays normally consist of an LCD unit and an associated keypad, where depression of a key activates one or more telephone functions.

It can be mentioned with regard to known technology, that the use of a touch screen has been proposed with regard to hand-carried computer terminals, with the intention of reducing the dimensions of a display surface, wherein selected functions can be activated through the medium of visible digits or other symbols, by exerting pressure on a surface section corresponding to the surface section of the symbol concerned, with the aid of a pointer.

Touch screens, or touch sheets, of this kind have been produced in the form of two mutually parallel plastic sheets, where a mechanical actuation of an uppermost sheet within a chosen surface section creates conditions for a resistance measurement perpendicular to said surface section, wherein the geographical position of said surface section on the touch screen can be established by a calculating circuit, with the aid of the resistance values established, and therewith generate a significant signal for a function related to a touched symbol.

In this case, there is used a hand-held and hand-manuevered elongate pointer having a tip, comparable to that of a pencil or pen, which requires physical actuation on and pressure against the chosen surface section of the display unit.

Also known to the art are touch screens that have relatively large external dimensions, where the dimensions chosen and a chosen screen thickness are of small account and constitute no limitation to the chosen application.

For example, it is known in respect of this use application to allow the touch screen to be comprised of a display unit in the form of an LCD unit, with edge-orientated and mutually opposite light-emitting units and light receiving units.

More particularly, in the case of this application the light-emitting units and the light receiving units are orientated in two rows and two columns over the upper surface of the display unit, with the transmitting and receiving directions of

the light rays orientated and directed immediately above the upper surface of the display unit, with said units directly opposite each other.

Light emitting circuits and light receiving circuits are also mutually co-ordinated and connected to a calculating or computing unit in this case, so as to evaluate and calculate a position representative of the geographical position on the upper surface of the display unit, where mutually intersecting light rays are shadowed by an object serving as a pointer, depending on the position of one or more coordinate-orientated light receiving units, having associated circuits which are intended to indicate the presence of light.

It is known in the case of this latter application to use the tip of an index finger as a pointer, and no physical actuation of or pressure against said display surface section is required in this particular technique, even though such is usual.

The contents of the patent publications listed below also belong to the earlier standpoint of techniques with regard to the use of a touch screen, in which light emitting and light receiving units and the tip of an index finger or the like function to activate signals corresponding to a chosen symbol presented on a surface section of the display surface.

U.S. Pat. No. 4,847,606

This publication illustrates and describes a control system (10), which in addition to a display panel (22) comprised of liquid crystals also includes a light source (20) and a light detector (36).

More specifically, the publication is concerned with allowing light from the light source to be directed through at least part of the liquid crystal display panel and onto the light detector.

The system (10) includes a casing (12), which is formed to be fitted to the instrument panel of a car, said panel including a sunken surface part (14) and being produced from a transparent material.

A casing part (18) is adapted to enclose the components related to the control system (10).

The light source (20) is illustrated in the form of a fluorescent lamp and is adapted to extend across the full width of the casing.

Light is able to pass through a number of "windows" (24) in the panel (22) and is reflected through 90 degrees by a mirror surface (26).

The light shall then pass a transparent casing-wall portion (28), and then through the sunken surface portion (14), and thereafter through an opposite wall portion (32), so as to be reflected onto the light detector or light receiver (36) by a mirror surface (34).

FIG. 1 of this patent publication shows that when a fingertip (49) is placed within the sunken surface (14), a number of light rays are shadowed within a defined area (48a), enabling this area to be detected.

FIG. 8 shows a system in which light sources and light detectors or light receivers are orientated in perpendicular co-ordinates.

U.S. Pat. No. 4,880,969

This patent publication describes and illustrates a programmable touch screen.

FIGS. 3 and 4 in particular illustrate an optical keyboard (12) which includes an IR-adapted light source (32), a light receiver (34) and optical "prism" or mirror surfaces (36, 38).

In this regard, FIG. 3 shows that these mirror surfaces (36, 38) are related to mutually opposite edge portions of a window surface (22).

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This publication illustrates and describes a touch screen, which is adapted to create control signals by means of which